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STATUS REVIEW OF Epipactis gigantea
U.S.D.A. FOREST SERVICE - REGION 1
FLATHEAD NATIONAL FOREST
MONTANA

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I. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Epipactis gigantea Dougl. ex Hook.
2. COMMON NAME: giant helleborine, chatterbox.
3. FAMILY: Orchidaceae (Orchid Family).
4. GENUS: Epipactis gigantea is one of approximately a dozen species in the genus that occur in temperate areas. Two of these species occur in North America, while the rest are found in Eurasia. A species native to Europe, Epipactis helleborine (helleborine) has escaped cultivation and become established in both eastern and western North America (Williams and Williams, 1983). In the west it is found in Victoria, Vancouver Island, Canada and Lewis and Clark County Montana (Hitchcock et al., 1964).
5. SPECIES: Epipactis gigantea was first described by Douglas in 1839 as occurring in the subalpine regions of the Blue and Rocky Mountains of northwest North America (Hitchcock et al., 1964). It is found in seepage areas and along streambanks, and is predominantly associated with thermal waters (especially along the northern edge of its range). Epipactis helleborine is similar in form, but differs in having smaller flowers and a smaller, unlobed lip, and is established more often in disturbed areas.

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: Epipactis gigantea currently has no designation.
- b. U.S. FOREST SERVICE: The U.S. Forest Service list of sensitive species for Region 1 (Northern Region) currently includes Epipactis gigantea (USDA Forest Service, 1988). Objectives and policy of the U.S. Forest Service provide for the management and protection of sensitive species under sections 2670.22 and 2670.32 in the 1984 Forest Service Manual. Under these guidelines the Forest Service is to: (a) "(m)aintain viable populations of all native species of plants" (2670.22), and to (b) "(a)void or minimize impacts to species whose viability has been identified as a concern" (2670.32.3).

2. **STATE:** Epipactis gigantea is currently listed by the Montana Natural Heritage Program as "apparently secure globally, though it may be quite rare in parts of its range" (over 100 occurrences; global rank = G4). In Montana, it is listed as "endangered in state" (6-20 occurrences; state rank = S2). These Heritage Program ranks do not provide any direct legal protection for this species.

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Giant helleborine (Epipactis gigantea) is a tall orchid with leafy stems, which reach 3 feet in height. Abundant sword-shaped leaves, to 8 inches long, clasp the tall, usually unbranched stems. Numerous flowers are borne in a leafy-bracted inflorescence at the tops of stems. Flowers have a sac-like lip petal that is reddish-brown. The two upper lance-shaped petals are also reddish brown, but with a greenish tinge. Three lance-shaped sepals subtend the flowers and are light green with a brownish tinge. Epipactis gigantea is a perennial plant that grows from a rhizome each year. In Montana this species usually flowers in June or July. Capsules ripen later in the season, and release many thousands of tiny seeds before the stems die back to the rhizomes to overwinter. See Section V, pp. 37-42, for color photos of plants and habitat.
2. **TECHNICAL DESCRIPTION:** Stems 1 to many from short rhizomes, mostly 3-7 (up to 12) dm. tall; leaves numerous, sheathing, the lowest blades almost lacking, gradually enlarged upwards, almost glabrous to scabridulous-puberulent, broadly elliptic-lanceolate, mostly 7-14 (19) cm. long and 1.5-5 (7) cm. broad; flowers 3-15, rather showy, raceme usually secund, bracts usually reduced upwards, but even the uppermost one usually exceeding the ovary; sepals coppery-green, lightly brownish-veined, 12-16 mm. long; petals similar to the sepals, but thinner, and (at least venation) more brownish-purple; lip 15-20 mm. long, the sac with prominent, raised, purplish lines leading to the base, three-lobed, outer (basal) lobes prominent, porrect, the blade (central lobe) about as long as the basal lobes, curved downward somewhat, triangular-ovate, tip flattened but with uprolled margins, greenish-yellow, basal portion much thickened, yellow, the margins thickened and erect, with

numerous linear callosities leading into the sac; column 6-9 mm. long; anther 4-5 mm. long; capsule reflexed, 2-3.5 cm. long (adapted from Hitchcock et al., 1964).

3. **LOCAL FIELD CHARACTERS:** Epipactis gigantea is distinguished by its tall leafy stems and numerous-flowered racemes. However, the reddish-green flowers blend in with background vegetation and are not easily noticed. Except for E. helleborine, no other species resembles E. gigantea.

As stated above, E. helleborine has escaped from cultivation and become established in Montana in Lewis and Clark County. It is distinguished from E. gigantea by its smaller flowers, and a smaller, unlobed lip.

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** Epipactis gigantea is widely distributed from British Columbia south to Baja California, east to the Rocky Mountains and south to Mexico (Brunton, 1986). However, populations within this large area are sparse. Within Region 1 of the U.S. Forest Service, it has been located on the Flathead National Forest in Montana. A distribution map for E. gigantea within Montana is in Figure 1, p. 4.
2. **CURRENT SITES (MONTANA):** The 1988 field surveys in Montana revealed five previously unknown occurrences for E. gigantea. This brings the total number of recently documented sites in Montana to ten. Six populations are recorded from Lake County, two from Flathead County, one from Carbon County, and one from Granite County. The legal descriptions, latitude and longitude, elevations, USGS topographic map names, and locations of sites in Montana are provided in Table 1, pp. 5-6. This table is broken down into sections; Table 1A contains those sites that occur wholly or partially on U.S. Forest Service lands, and Table 1B contains sites that occur on lands of other ownership. Complete Element Occurrence records on these sites are found in Section IV, pp. 19-29. Also, the exact locations are indicated on the maps provided in Section IV, pp. 30-36. Field surveys were conducted in 1984 by Peter Lesica (The Nature Conservancy) and by the author on 5-14 July 1988.

Throughout this report, the three-digit occurrence numbers are indicated in parentheses after the site

Figure 1. Distribution of Epipactis gigantea populations in Montana.

Table 1A. Epipactis gigantea locations wholly or partially occurring on U.S. Forest Service lands, Lake County, Montana.

Occurrence number: 002

Site name: SWAN RIVER

COUNTY: LAKE

Township & Range: 024N018W Section: 02, SW¼

Latitude: 475148 Longitude: 1135209 Elevation: 3105

USGS Quad: CILLY CREEK

Location: SWAN RIVER VALLEY, 1.7 AIR MILES WEST OF ST. HWY. 83, 0.35 AIR MILES SSE. OF PORCUPINE CREEK, CA. 4 MILES SSW. OF SWAN LAKE.

Occurrence number: 005

Site name: SWAN LAKE

COUNTY: LAKE

Township & Range: 025N018W Section: 11, SW¼, S¼NE¼

Latitude: 475623 Longitude: 1135102 Elevation: 3200

USGS Quad: SWAN LAKE

Location: NORTH END OF SWAN VALLEY, ABOUT 0.7-1.1 AIR MILES NORTHWEST TO NNE OF SWAN LAKE (TOWN), ADJACENT TO ST. HWY 83 AND FLATHEAD N.F. RD. 9508.

Occurrence number: 008

Site name: BOND CREEK

COUNTY: LAKE

Township & Range: 025N017W Section: 18, NE¼SW¼SW¼, SW¼SE¼; T25NR18W: SEC 24, E¼NE¼NE¼

Latitude: 475523 Longitude: 1134832 Elevation: 3400

USGS Quad: SWAN LAKE

Location: CA. 2 AIR MILES EAST OF SWAN LAKE, CA. 1.8 MILES EAST OF HIGHWAY 83 ON BOND CREEK TRAIL, EAST AND WEST OF TRAIL 0.1 MILE.

Occurrence number: 011

Site name: LOWER FATTY CREEK ROAD

COUNTY: LAKE

Township & Range: 024N018W Section: 11, SW¼SE¼, SEC 14, NW¼NE¼ Latitude: 475053 Longitude: 1135145

Elevation: 3110

USGS Quad: CILLY CREEK

Location: CA. 5.3 AIR MILES SW OF SWAN LAKE, CA. 1.5 MILES WEST OF HIGHWAY 83 ON PORCUPINE CREEK ROAD, SOUTH 3.1 MILES ON LOWER FATTY CREEK ROAD; WEST OF ROAD.

Table 1B. Epipactis gigantea locations on areas other than U.S. Forest Service lands.

Occurrence number: 001

Site name: NIMROD WARM SPRINGS

COUNTY: GRANITE

Township & Range: 011N015W Section: 14, SW¼

Latitude: 464219 Longitude: 1132716 Elevation: 3760

USGS Quad: BEARMOUTH (15)

Location: NIMROD WARM SPRINGS, ALONG NORTH SIDE OF CLARK FORK RIVER CA. 30 MI. EAST OF MISSOULA (ADJACENT TO "BYRNE"-USGS MAP).

Occurrence number: 003

Site name: BLUEWATER SPRING

COUNTY: CARBON

Township & Range: 006S024E Section: 15, SW¼

Latitude: 451840 Longitude: 1084625 Elevation: 4100

USGS Quad: BLUEWATER

Location: ALONG NORTH FORK BLUEWATER CREEK AROUND BLUEWATER SPRING; ABOUT 2.0 AIR MILES SOUTHEAST OF BLUEWATER FISH HATCHERY AND 6 MILES EAST OF BRIDGER.

Occurrence number: 006

Site name: ECHO LAKE

COUNTY: FLATHEAD

Township & Range: 028N019W Section: 34 Subsection/additional sections: SE4

Latitude: 480823 Longitude: 1135920 Elevation: 3120

USGS Quad: JEWEL BASIN

Location: ALONG ROAD TO JEWEL BASIN (FLATHEAD NF RD 5392), CA. 6.5 AIR MILES NE OF BIGFORK, CA. 2 MILES EAST OF ECHO LAKE.

Occurrence number: 007

Site name: LOWER GRASSY CREEK

COUNTY: LAKE

Township & Range: 025N018W Section: 13, SE¼NW¼NW¼, NE¼SW¼NW¼

Latitude: 475556 Longitude: 1134950 Elevation: 3260

USGS Quad: SWAN LAKE

Location: CA. 0.6 MILE NE OF HIGHWAY 83 AT SWAN LAKE, ALONG THE GROOM CREEK ROAD, SE OF ROAD.

Occurrence number: 009

Site name: KRAUSE BASIN ROAD

COUNTY: FLATHEAD

Township & Range: 028N019W Section: 28, E¼NE¼

Latitude: 480951 Longitude: 1140037 Elevation: 3260

USGS Quad: HASH MOUNTAIN

Location: CA. 14 AIR MILES EAST OF KALISPELL; CA. 1.8 MILES EAST OF FOOTHILL ROAD, ON LOWER KRAUSE BASIN ROAD, SOUTH OF ROAD.

Occurrence number: 010

Site name: STOPPER CREEK

COUNTY: LAKE

Township & Range: 025N018W Section: 27, SE¼NW¼NW¼, NE¼SW¼NW¼

Latitude: 475416 Longitude: 1135225 Elevation: 3100

USGS Quad: SWAN LAKE

Location: CA. 2 AIR MILES SW OF SWAN LAKE. TRAVEL 1.5 MILES WEST OF HIGHWAY 83 ON PORCUPINE CREEK ROAD, CA. 1.3 MILES NORTH ON YEW CREEK ROAD.

names; these correspond to the occurrence numbers provided in the tables and computer print-outs.

3. **HISTORICAL SITES (MONTANA):** One location of E. gigantea is documented by a voucher specimen collected in 1912, and annotated by L.A. Mehrhoff in 1977. The existing data on this site, Yellow Bay (004), is summarized in Section IV, p. 22 (Element Occurrence records). Information on this record is incomplete, and only a general location is given. This record was unmappable as a specific point, but is marked as occurring on the USGS Woods Bay and Bull Island quadrangle maps. This historical location is indicated in Figure 1, p. 4.

Also, it has been reported as occurring in Glacier National Park (Lesica, 1985), but the exact location is unknown.

4. **AREAS SURVEYED BUT SPECIES NOT LOCATED:** The following areas in Lake and Flathead counties were searched in 1988, but no populations of E. gigantea were located. The actual areas surveyed were often smaller than the portions of the sections indicated. The list is organized by township, range and section number, and all sites are on Flathead National Forest land unless marked otherwise.

LAKE COUNTY

T23N, R18W, SEC 13 SE $\frac{1}{4}$ OF SW $\frac{1}{4}$ (PRIVATE)
 T23N, R18W, SEC 24 NE $\frac{1}{4}$ OF NW $\frac{1}{4}$
 T23N, R18W, SEC 24 NW $\frac{1}{4}$ OF NW $\frac{1}{4}$ (STATE)
 T24N, R17W, SEC 20 SE $\frac{1}{4}$ OF NE $\frac{1}{4}$ (STATE)
 T24N, R17W, SEC 21 SE $\frac{1}{4}$ OF SW $\frac{1}{4}$ (STATE)
 T24N, R18W, SEC 13 NE $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T25N, R17W, SEC 18 S $\frac{1}{2}$ OF NW $\frac{1}{4}$
 T25N, R17W, SEC 30 NW $\frac{1}{4}$
 T25N, R17W, SEC 31 SW $\frac{1}{4}$ OF SE $\frac{1}{4}$
 T25N, R17W, SEC 6 SW $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T25N, R18W, SEC 13 SE $\frac{1}{4}$ OF NE $\frac{1}{4}$
 T25N, R18W, SEC 16 SW $\frac{1}{4}$ OF SE $\frac{1}{4}$
 T25N, R18W, SEC 21 E $\frac{1}{2}$ OF NE $\frac{1}{4}$ ($\frac{1}{2}$ PRIVATE)
 T25N, R18W, SEC 22 SW $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T25N, R18W, SEC 3 NE $\frac{1}{4}$
 T25N, R18W, SEC 34 W $\frac{1}{2}$ OF SE $\frac{1}{4}$
 T25N, R18W, SEC 4 SW $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T25N, R18W, SEC 5 SE $\frac{1}{4}$ OF NW $\frac{1}{4}$
 T25N, R18W, SEC 6 NW $\frac{1}{4}$ OF NE $\frac{1}{4}$, NE $\frac{1}{4}$ OF NW $\frac{1}{4}$
 T26N, R18W, SEC 34 SW $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T26N, R19W, SEC 30 SE $\frac{1}{4}$ OF SE $\frac{1}{4}$
 T26N, R19W, SEC 36 NE $\frac{1}{4}$ OF NE $\frac{1}{4}$

FLATHEAD COUNTY

T27N, R18W, SEC 19 NE $\frac{1}{4}$ OF SW $\frac{1}{4}$, SE $\frac{1}{4}$ OF NW $\frac{1}{4}$
 T27N, R18W, SEC 30 S $\frac{1}{2}$ OF SW $\frac{1}{4}$
 T27N, R19W, SEC 3 NW $\frac{1}{4}$ OF NE $\frac{1}{4}$ (STATE)
 T28N, R19W, SEC 15 NW $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T28N, R19W, SEC 16 SE $\frac{1}{4}$
 T29N, R19W, SEC 2 NE $\frac{1}{4}$ OF SE $\frac{1}{4}$
 T30N, R19W, SEC 16 NE $\frac{1}{4}$ OF NE $\frac{1}{4}$
 T30N, R19W, SEC 25 NE $\frac{1}{4}$ OF NE $\frac{1}{4}$
 T30N, R19W, SEC 26 SW $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T30N, R19W, SEC 27 NE $\frac{1}{4}$ OF SE $\frac{1}{4}$
 T30N, R19W, SEC 9 SW $\frac{1}{4}$ OF SE $\frac{1}{4}$
 T31N, R18W, SEC 6 NW $\frac{1}{4}$ OF NW $\frac{1}{4}$
 T31N, R20W, SEC 19 E $\frac{1}{2}$ OF NE $\frac{1}{4}$
 T31N, R20W, SEC 20 S $\frac{1}{2}$ OF NE $\frac{1}{4}$
 T31N, R20W, SEC 3 NW $\frac{1}{4}$; SEC 4 NE $\frac{1}{4}$
 T31N, R21W, SEC 13 SE $\frac{1}{4}$ OF NW $\frac{1}{4}$
 T31N, R21W, SEC 24 NW $\frac{1}{4}$ OF SE $\frac{1}{4}$
 T32N, R18W, SEC 31 SE $\frac{1}{4}$ OF SW $\frac{1}{4}$
 T32N, R20W, SEC 31 NW $\frac{1}{4}$
 T32N, R20W, SEC 34 W $\frac{1}{2}$
 T32N, R20W, SEC 7 SW $\frac{1}{4}$
 T32N, R21W, SEC 36 SE $\frac{1}{4}$ OF NE $\frac{1}{4}$

E. HABITAT

1. **ASSOCIATED VEGETATION:** Epipactis gigantea usually occurs in moist seeps, sometimes in calcareous soils and, often in areas of high vegetation cover, but usually where overstory cover is low. These sites are highly variable with respect to vegetation components and associated species. For example, sites in the Swan Valley are surrounded by forests composed of Picea engelmannii and Betula papyrifera, while the Nimrod Warm Springs (001) site is surrounded by shrubland, with a sparse cover of Pinus ponderosa and Pseudotsuga menziesii (Douglas fir). Furthermore, the Bluewater Spring (003) site is surrounded by sagebrush grassland. A list of species found associated with E. gigantea at the various sites follows:

Alnus incana(thinleaf alder)
Aster occidentalis(western aster)
Betula glandulosa(bog birch)
Betula papyrifera(paper birch)
Carex comosa(bristly sedge)
Carex flava(yellow sedge)
Centaurea maculosa(spotted knapweed)
Cornus stolonifera(red osier dogwood)

Equisetum arvense(field horsetail)
Habenaria dilatata(white bog-orchid)
Helianthus nuttallii(Nuttall's sunflower)
Menyanthes trifoliata(buckbean)
Mimulus guttatus(common monkey-flower)
Picea engelmannii(Engelman spruce)
Populus trichocarpa(black cottonwood)
Rhamnus alnifolia(alder buckthorn)
Rorippa nasturtium-aquaticum .(water cress)
Salix sp.(willow)
Salix candida(hoary willow)
Scirpus sp.(bulrush)
Senecio triangularis(arrowleaf groundsel)
Thalictrum sp.(meadowrue)
Typha latifolia(common cattail)
Zigadenus elegans(glaucous zigadenus)

2. **TOPOGRAPHY:** In Montana, populations of E. gigantea are most often associated with warm springs, on level to gently sloping ground. One site was found on a steep slope; however, the plants at this site occurred in level zones on the slope. All slope aspects were represented. However, populations were often at least shaded for some parts of the day.

The sites in Montana range from 945 m. (3,100 ft.) to 1250 m. (4,100 ft.) in elevation.

3. **SOIL RELATIONSHIPS:** Epipactis gigantea is associated with spring seeps, and often occurs in the vicinity of warm springs as Luer (1975) suggests. Canada's largest known population is found along the margins of a hot spring, as were some recently extirpated populations in that country. The soils at these Canadian sites are calcareous, and are often composed of porous, exposed tufa or limestone bedrock (Brunton, 1986). Although not specifically tested, the soils underlying many of the Montana populations may also be somewhat calcareous, as was evidenced by whitish precipitates coating rocks in the running water. The Nimrod Warm Springs (001) site appears to be on travertine deposits.

4. **REGIONAL CLIMATE:** Epipactis gigantea is widely distributed across Montana, occurring in sagebrush grasslands in Carbon County and in spruce-fir forests in Lake County; thus, the sites have widely differing climatic conditions. The ability to tolerate a wide variety of conditions is further suggested by the wide range of the species, which extends from Canada to south-central Mexico (Luer, 1975). In the northern parts of its range, this plant appears to

depend on perennial, often thermal seepage areas, which may allow it to persist in colder climates.

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** This species flowers from March through August, depending on the latitude of the site (Luer, 1975). In Montana, mid-June is the earliest date recorded for flowering (Bluewater Spring (003)), and flowering may extend into August (Nimrod Warm Springs (001)).
2. **POPULATION SIZE AND CONDITION (MONTANA):** Populations of E. gigantea range in size from approximately 185 stems, up to 5,000+ stems. The average population size is approximately 1,000 stems. See Table 2., pp. 11-12, for information on population sizes and conditions in Montana.

The amount of area inhabited by this species is most likely influenced, at least in Montana, by the extent of mineral, warm water springs. The average area covered by a population is about two acres. Thus, although populations might have a large number of stems, the total area covered by this species in Montana amounts to only approximately 21 acres.

3. REPRODUCTIVE BIOLOGY

- a. **TYPE OF REPRODUCTION:** Epipactis gigantea produces numerous flowers, and is known to be an outcrossing species (Brunton, 1986). It is also a perennial, and populations may enlarge by vegetative reproduction through extension of rhizomes.
- b. **POLLINATION BIOLOGY:** All species in the genus Epipactis offer nectar as an insect reward, thus they may exploit relatively unspecialized pollinators (Burns-Balogh et al., 1987). A wide variety of insects are represented as pollinators; however, "the genus is regarded as 'wasp pollinated'" by Burns-Balogh et al. (1987). Syrphid flies are the known pollinators of E. gigantea (Luer, 1975; Brunton, 1986), but there may be others.
- c. **SEED DISPERSAL AND BIOLOGY:** All orchids produce capsules filled with numerous minute seeds (Hitchcock et al., 1969), which are most often dispersed by wind. The capsules of E. gigantea are ellipsoid and pendent (Luer, 1975), which

Table 2. Epipactis gigantea population sizes and condition.

Occurrence number: 001

Site name: NIMROD WARM SPRINGS

Acreage: 2

Population size and condition: LARGE POPULATION, 101-1000 PLANTS; RHIZOMATOUS; WET AREAS RIGHT BY SPRING ARE IN FAIRLY GOOD SHAPE, THOUGH SURROUNDING AREA IS THREATENED BY SWIMMERS, DEVELOPMENT, AND HIGHWAY IMPROVEMENT.

Occurrence number: 002

Site name: SWAN RIVER

Acreage: 1

Population size and condition: 101-1000 INDIVIDUALS, IN FLOWER.

Occurrence number: 003

Site name: BLUEWATER SPRING

Acreage: 0

Population size and condition: COMMON; EXCELLENT SITE, TWO GOOD SUBPOPULATIONS.

Occurrence number: 004

Site name: YELLOW BAY

Acreage: 0

Population size and condition: THE NATURE CONSERVANCY, FIELD CHECKED IN 1984 - COULD NOT BE LOCATED; POSSIBLY EXTIRPATED.

Occurrence number: 005

Site name: SWAN LAKE

Acreage: 10

Population size and condition: FOUR SUBPOPULATIONS, EST. 2500-4000 STEMS TOTAL; BEST POPULATION (LARGEST POPULATION IS ON MARGIN OF MEADOW BETWEEN UPPER (9508) AND LOWER ROADS; SOIL IS CALCAREOUS, AREA MAY HAVE BEEN THERMALLY ACTIVE; HWY SITE IS SPRAYED.

Occurrence number: 006

Site name: ECHO LAKE

Acreage: 1

Population size and condition: EST. 200-300 PLANTS, FLOWERING; SEVERAL PLANTS GRAZED.

Occurrence number: 007

Site name: LOWER GRASSY CREEK

Acreage: 1

Population size and condition: CA. 200 PLANTS, FLOWERING.

Occurrence number: 008

Site name: BOND CREEK

Acreage: 2

Population size and condition: 255 PLANTS IN 3 SUBPOPULATIONS, FEW FLOWERING.

Table 2. (cont.)

Occurrence number: 009

Site name: KRAUSE BASIN ROAD

Acreage: 2

Population size and condition: CA. 5,000 PLANTS; FLOWERING.

Occurrence number: 010

Site name: STOPPER CREEK

Acreage: 1

Population size and condition: CA. 185 PLANTS IN TWO SUBPOPULATIONS, FLOWERING.

Occurrence number: 011

Site name: LOWER FATTY CREEK ROAD

Acreage: 1

Population size and condition: CA. 200 PLANTS, FLOWERING AND FRUITING.

could facilitate seed dispersal.

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

- a. **COMPETITION:** Based on observations of known populations in Canada (where sites had low herbaceous vegetation cover), Brunton (1986) felt that E. gigantea was a poor competitor. However, in Montana, many sites had very high herbaceous vegetation cover (see photographs, Section V, pp. 37-42). It is the belief of the author that this species is tolerant of interspecific competition, and instead is limited by chemical, edaphic, or hydrological factors at sites where it occurs. For several subpopulations (Bond Creek (008)) where overstory shading was high, the number of flowering stems was reduced; thus, this species may not flower well in such habitats.
- b. **HERBIVORY:** The Montana populations are quite localized, and grazing does not currently appear to have affected them. There is no documentation on the effects of insect predation or disease in this species (Brunton, 1986).

H. LAND OWNERSHIP (MONTANA)

1. The land ownership for the 10 currently known populations in Montana is given below. The exact locations are provided in Table 1, pp. 5-6.
 - a. **U.S. Forest Service (Flathead National Forest):**

Swan Lake Ranger District

Cilly Creek (002)
Swan Lake (005)
Bond Creek (008)
Lower Fatty Creek Road (011)
 - b. **Department of State Lands:**

Krause Basin Road (009)
Echo Lake (006)
 - c. **Private Land:**

Nimrod Warm Springs (001)
Bluewater Spring (003)

Lower Grassy Creek (007)
Stopper Creek (010)

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. THREATS TO CURRENTLY KNOWN POPULATIONS:

1. **GRAZING:** Both of the sites on State of Montana land (Echo Lake (006) and Krause Basin Road (009)) are included in grazing allotments. Neither site appeared to be severely impacted by grazing; however, there is a well used cattle trail just east of the latter population.
2. **TIMBER HARVESTING:** Epipactis gigantea is likely to be impacted by timber harvesting through overstory removal and road building, either of which result in a modification of the hydrology of an area. Several sites (Echo Lake (006), Stopper Creek (010), Lower Fatty Creek Road (011)) have populations present in barrow pits along Forest Service roads. It is suspected that the Forest Service roadways were cut through areas previously populated by this species, but which then diverted the water flow to barrow pits. These populations may have been more extensive prior to road building activities.
3. **WEED CONTROL ACTIVITIES:** The same three populations listed above under timber harvesting, plus Swan Lake (005) and Nimrod Warm Springs (001) sites, are likely to be influenced by weed control owing to their proximity to Forest roadways or highways. Centaurea maculosa is currently invading the Nimrod Warm Springs site (001).
4. **RECREATIONAL ACTIVITIES:** The Nimrod Warm Springs site (001) is a popular area for swimmers, and this population may be threatened by their activities.

- B. **MANAGEMENT PRACTICES AND RESPONSE:** As stated previously, populations of Epipactis gigantea appear to be restricted (at least in Montana) to warm water spring areas. This may be due in part to edaphic or chemical factors that are only found at these types of sites. Because of this restriction, it is necessary to limit any development at or near these sites that might change the water regime in the area. For example, of twelve previously known sites in Canada, three sites have already been lost to resort development, and another is threatened (Brunton, 1986).

One site is within the proposed Swan River Research Natural Area (Swan River (002)), and as such, is likely to

be adequately protected unless the surrounding forests are considered for logging.

C. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:

1. Protection of natural habitats that currently support large populations. The following populations on U.S. Forest Service lands should be considered in any habitat alteration projects that may occur in or near these sites (especially logging and road-building or expansion):

Swan River (002)
Swan Lake (005)
Bond Creek (008)
Lower Fatty Creek Road (011)

Any proposed management actions within or near any of these sites should be preceded by detailed surveys of the populations in these areas; mitigation measures should be developed to reduce or eliminate the impacts of these activities.

2. Regulation of livestock grazing in native habitats supporting large populations. Grazing does not currently threaten any of the sites on Forest Service land; however, the state-owned Krause Basin Road (009) population is part of a grazing allotment, and near a heavily used cattle trail. This site should be monitored if management recommendations change in the future.

D. RECOMMENDATIONS FOR FURTHER ASSESSMENT:

1. Establishment of monitoring studies on U.S. Forest Service lands. The Swan River (002) site would be appropriate for establishing monitoring transects to study the life-history traits of this species. Other potential studies might include an analysis of plant tissue and spring water to determine if specific minerals might be involved in the restriction of the plants to these sites. An analysis of thermal regimes at various sites, and tests to determine the ability of rhizomes to endure freezing conditions, might also provide some insight into the ecology of this orchid.

Warm water seeps, or springs are potential sites for E. gigantea, and these should be checked for the orchids presence. Glacier National Park may possibly harbor populations of this orchid.

E. SUMMARY

Although Epipactis gigantea is a widely distributed species, it is rare throughout its range because of its restriction to very specialized sites. Edaphic or chemical factors, as well as the presence of perennial water seepage, may be important in determining its distribution. Field surveys in Montana in 1988 revealed five previously unrecorded occurrences of this species, all within the lower Swan River Valley. Two of these sites are on Flathead National Forest lands, one is on State of Montana land and three are on private land. It is currently included on the sensitive species list for Region 1 (Northern Region) of the U.S. Forest Service. The species appears to be restricted to warm water springs across Montana, in a wide variety of vegetation types. This restriction, and the fact that several of the sites in Canada have been lost, and another is threatened by development, indicates a need to monitor populations. Several of the sites in Montana are also along National Forest roadways. Thus, it is important to take these areas into consideration when planning land use activities that may affect these populations.

III. LITERATURE CITED

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IV. ELEMENT OCCURRENCE PRINT-OUTS AND MAPS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.001
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 2 TENTEN: 2.2 IDENT: Y EORANK: BC
 SURVEYSITE: NIMROD WARM SPRINGS
 EORANKCOMM: FAIRLY LARGE POPULATION; HABITAT ADJACENT TO EXPRESSWAY
 SURVEYDATE: 1984-08-04 LASTOBS: 1986-07-10 FIRSTOBS: 1984 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAM: MTGRAN
 QUADCODE: 4611364
 QUADNAME: BEARMOUTH (15) PRECISION: S
 LAT: 464219 LONG: 1132716 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 011N015W SECTION: 14 MERIDIAN: PR TRSCOMM: SW4
 PHYSPROV: NR WATERSHED: 17010201 RIVERREACH: 1701020100700.00
 DIRECTIONS: NIMROD WARM SPRINGS, ALONG NORTH SIDE OF CLARK FORK RIVER
 CA. 30 MI. EAST OF MISSOULA (ADJACENT TO "BYRNE"-USGS MAP).
 GENDESC: AROUND WARM SPRINGS, ON SOUTH-FACING SLOPE; WHOLE AREA IS ON
 TRAVERTINE DEPOSITS; WITH HELIANTHUS NUTTALLII, THALICTRUM,
 MIMULUS GUTTATUS.
 ELEV: 3760 SIZE: 2
 EODATA: LARGE POPULATION, 101-1000 PLANTS; RHIZOMATOUS; WET AREAS
 RIGHT BY SPRING ARE IN FAIRLY GOOD SHAPE, THOUGH SURROUNDING
 AREA IS THREATENED BY SWIMMERS, DEVELOPMENT, AND HIGHWAY
 IMPROVEMENT.
 COMMENTS: AREA SURROUNDING SITE INVADDED BY CENTAUREA SP. (KNAPWEED)
 AND CIRSIUM SP. (THISTLE). LESICA, P. (3229), 1984, MONTU.
 MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: PNCRSNIMR1MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME: NIMROD WARM SPRINGS
 OWNER: VASIL & KAETHE CZORNY
 OWNERCOMM: 2400 MARSHALL RD., MISSOULA, MT 59801; (406) 258-6275.
 PROTCOMM: SITE IS REGISTERED BY TNC BIG SKY FIELD OFFICE.
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: LESICA, P. DEPT. OF BOTANY, UNIV. OF MONTANA, MISSOULA, MT.
 (3229). 1984. SPECIMEN #07479 UM.
 SOURCECODE: PNDLES01MTUS SB4LESUMMTUS U85LES02MTUS S68DOLUMMTUS PNDSE01MTUS
 DATASENS: N BOUNDARIES: N PHOTOS: N OWNERINFO:
 TRANSCRIBR: 86-03-19 JSS CDREV: Y MAPPER: 86-03-19 JSS QC: Y
 UPDATE: 88-12-01 LAS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.002
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 2 TENTEN: 1,1 IDENT: Y EORANK: A
 SURVEYSITE: SWAN RIVER
 EORANKCOMM: GOOD SITE-HARD TO ACCESS
 SURVEYDATE: 1985-07-23 LASTOBS: 1988-07-08 FIRSTOBS: 1985 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
 QUADCODE: 4711377
 QUADNAME: CILLY CREEK
 LAT: 475148 LONG: 1135209 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 024N018W SECTION: 02 MERIDIAN: PR TRSCOMM: SW4
 PRECISION: S
 PHYSPROV: NR WATERSHED: 17010211 RIVERREACH: 1701021100900.00
 DIRECTIONS: SWAN RIVER VALLEY, 1.7 AIR MILES WEST OF ST. HWY. 83, 0.35
 AIR MILES SSE. OF PORCUPINE CREEK, CA. 4 MILES SSW. OF SWAN
 LAKE.
 GENDESC: LARGE MEADOW IN A SHALLOW GLACIAL BASIN; CENTER OF MEADOW IS
 OPEN WATER, WITH NUPHAR, POTAMOGETON, SCIRPUS, SURROUNDED BY
 A FLOATING SEDGE MAT WITH DROSERA SPP., CAREX SPP., (CONT.)
 ELEV: 3105 SIZE: 1
 EODATA: 101-1000 INDIVIDUALS, IN FLOWER; GENDESC (CONT.):
 SCATTERED SPHAGNUM CLUMPS, MENYANTHES, BETULA GLANDULOSA,
 ZIGADENUS ELEGANS, TYPHA LATIFOLIA, PARNASSIA, SALIX CANDIDA.
 COMMENTS: VOUCHER PIERCE, J. (1320), 1985, SPECIMEN #102540 UM.
 MACODE1: FFSPLSWAN1MTUS CONTAINED1: N MACODE2: FFSNFFLAT9MTUS CONTAINED2:
 Y
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: FLATHEAD N.F.
 OWNERCOMM:
 PROTCOMM: SWAN RIVER PROPOSED RESEARCH NATURAL AREA.
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: PIERCE, JOHN. 737 LOCUST ST., MISSOULA, MT.
 SOURCECODE: PNDPIE01MTUS S85PIE7MMTUS A81JOH01MTUS U85LES02MTUS PND SCH02MTUS
 PND MOR01MTUS
 DATASENS: BOUNDARIES: N PHOTOS: OWNERINFO:
 TRANSCRIBR: 86-03-20 JSS CDREV: Y MAPPER: 86-03-20 JSS QC: Y
 UPDATE: 88-12-02 LAS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.003
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 3 TENTEN: 9,6 IDENT: Y EORANK: A
 SURVEYSITE: BLUEWATER SPRING
 EORANKCOMM: EXCELLENT SITE, TWO GOOD SUBPOPULATIONS.
 SURVEYDATE: 1984- LASTOBS: 1984-06-14 FIRSTOBS: 1984 GRANK: 64
 SRANK: S1 STATE: MT COUNTYNAME: MTCARB
 QUADCODE: 4510837
 QUADNAME: BLUEWATER PRECISION: S
 LAT: 451840 LONG: 1084625 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 006S024E SECTION: 15 MERIDIAN: PR TRSCOMM: SW4
 PHYSPROV: MB WATERSHED: 10070006 RIVERREACH:
 DIRECTIONS: ALONG NORTH FORK BLUEWATER CREEK AROUND BLUEWATER SPRING;
 ABOUT 2.0 AIR MILES SOUTHEAST OF BLUEWATER FISH HATCHERY AND
 6 MILES EAST OF BRIDGER.
 GENDESC: IN WET MARLY SOIL; SAGEBRUSH GRASSLAND AREA, WITH MIMULUS
 GUTTATUS, RORIPPA NASTURTIUM-AQUATICUM.
 ELEV: 4100 SIZE: 0
 EODATA: COMMON; "EXCELLENT SITE, TWO GOOD SUBPOPULATIONS" (FIELD
 OFFICE SCORECARD).

COMMENTS: LESICA, P. (3000), 1984, SPECIMEN #05922 UM.

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: TOM AND FERN LESTER
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM: -
 BESTSOURCE: LESICA, P., AND S. MOLINA. 1985. AN INVENTORY OF SIGNIFICANT
 BOTANICAL FEATURES ALONG MT RIVERS. PNW RIVERS STUDY. 54 PP.
 SOURCECODE: U85LES02MTUS PNDLES01MTUS S84LESUMMTUS
 DATASENS: N BOUNDARIES: N PHOTOS: N OWNERINFO:
 TRANSCRIBR: 86-04-16 JSS CDREV: Y MAPPER: 86-04-23 JSS QC: Y
 UPDATE: 88-12-02 LAS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.004
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 3 TENTEN: 8,10 IDENT: Y EORANK:
 SURVEYSITE: YELLOW BAY
 EORANKCOMM:
 SURVEYDATE: 1984- LASTOBS: 1912-07-12 FIRSTOBS: 1912 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
 QUADCODE: 4711481 4711471
 QUADNAME: WOODS BAY, BULL ISLAND PRECISION: M
 LAT: 475230 LONG: 1140140 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 024N019W SECTION: 04 MERIDIAN: PR TRSCOMM: NE4
 PHYSPROV: NR WATERSHED: 17010208 RIVERREACH: 1701020800200.00
 DIRECTIONS: YELLOW BAY (ALONG E. SHORE OF FLATHEAD LAKE).

GENDESC: UNKNOWN

ELEV: 2900 SIZE: 0
 EODATA: TNC FIELD CHECK IN 1984 - COULD NOT BE LOCATED; POSSIBLY
 EXTIRPATED.

COMMENTS: NAME UNKNOWN, 1912, SPECIMEN #1981 UM, ANNOTATED BY L.A.
 MEHRHOFF, 1977.

MACODE1: SUMSPYELL1MTUS CONTAINED1: MACODE2: SFWSPYELL1MTUS CONTAINED2:

MACODE3: FBIIRFLAT1MTUS CONTAINED3: Y ADLMAS: N MORELAN: MOREPROT:

MOREMGMT: F SITECODE:

SITENAME:

OWNER:

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: LESICA, P., AND S. MOLINA. 1985. AN INVENTORY OF SIGNIFICANT
 BOTANICAL FEATURES ALONG MT RIVERS. PNW RIVERS STUDY. 54 PP

SOURCECODE: U85LES02MTUS PNDLES01MTUS S12XXXUMMTUS

DATASENS: N BOUNDARIES: N PHOTOS: N OWNERINFO:

TRANSCRIBR: 86-04-16 JSS CDREV: Y MAPPER: 86-05-05 JSS QC: Y

UPDATE: 87-08-14 JEG

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.005
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 4 TENTEN: 3,5 IDENT: Y EORANK: A
 SURVEYSITE: SWAN LAKE
 EORANKCOMM: LARGE, PRISTINE SITE IN MEADOW IS BEST POPULATION.
 SURVEYDATE: 1987-06-24 LASTOBS: 1988-07-04 FIRSTOBS: 1905 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAM: MTLAKE
 QUADCODE: 4711387
 QUADNAME: SWAN LAKE PRECISION: SC
 LAT: 475623 LONG: 1135102 S: 475614 N: 475640 E: 1135029 W: 1135120
 TOWNRANGE: 025N018W SECTION: 11 MERIDIAN: PR TRSCOMM: SW4,S2NE4
 PHYSPROV: NR WATERSHED: 17010211 RIVERREACH:
 DIRECTIONS: NORTH END OF SWAN VALLEY, ABOUT 0.7-1.1 AIR MILES NORTHWEST
 TO NNE OF SWAN LAKE (TOWN), ADJACENT TO ST. HWY 83 AND
 FLATHEAD N.F. RD. 9508.
 GENDESC: UNDISTURBED, SEEPY MEADOW AREAS, AND ROADSIDES; PIEN/POTR/
 BETULA PAPYRIFERA, WITH RHAMNUS ALNIFOLIA, CORNUS
 STOLONIFERA, CAREX FLAVA, ALNUS INCANA.
 ELEV: 3200 SIZE: 10
 EODATA: FOUR SUBPOPULATIONS, EST. 2500-4000 STEMS TOTAL; BEST
 POPULATION (=CENTRUM) IS ON MARGIN OF MEADOW BETWEEN UPPER
 (9508) AND LOWER ROADS; SOIL IS CALCAREOUS, AREA MAY HAVE
 BEEN THERMALLY ACTIVE; HWY SITE IS SPRAYED.
 COMMENTS: VOUCHER-SHELLY, J.S. (1343), 1987, UM; PROBABLE RELOCATION
 OF NORTON, 1906, SPECIMEN #77929 UM & SELLOWAY, 1905.
 MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: FLATHEAD NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA
 COUNTIES OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
 SOURCECODE: F87SHE03MTUS PNDSE01MTUS S87SHEUMMTUS PNDMOR01MTUS S06NORUMMTUS
 S08JONUMMTUS U85LES02MTUS S05SELUMMTUS PNDLAS02MTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 87-08-20 JSS CDREV: Y MAPPER: 87-08-21 JEG QC: Y
 UPDATE: 88-12-02 LAS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.006
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 1 TENTEN: 1,9 IDENT: Y EORANK: C
 SURVEYSITE: ECHO LAKE
 EORANKCOMM: MARGINAL QUALITY SITE, ADJACENT TO GRAVEL ROAD.
 SURVEYDATE: 1986-07-12 LASTOBS: 1988-07-06 FIRSTOBS: 1986 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAME: MTFLAT
 QUADCODE: 4811328
 QUADNAME: JEWEL BASIN PRECISION: SC
 LAT: 480823 LONG: 1135920 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 028N019W SECTION: 34 MERIDIAN: PR TRSCOMM: SE4
 PHYSPROV: NR WATERSHED: 17010211 RIVERREACH:
 DIRECTIONS: ALONG ROAD TO JEWEL BASIN (FLATHEAD NF RD 5392), CA. 6.5 AIR
 MILES NE OF BIGFORK, CA. 2 MILES EAST OF ECHO LAKE.
 GENDESC: ALONG ROAD AND POND EDGE, ON MARGIN OF A SPRUCE SWAMP WITH A
 NUMBER OF SPRINGS; WITH EQUISETUM ARVENSE, CAREX COMOSA, C.
 FLAVA, ASTER OCCIDENTALIS.
 ELEV: 3120 SIZE: 1
 EODATA: EST. 200-300 PLANTS, FLOWERING; SEVERAL PLANTS GRAZED.
 COMMENTS: LESICA, P. (3955), 1986, SPECIMEN #104447 MONTU.
 MACODE1: SSLGNXXX1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER:
 OWNERCOMM:
 PROTCOMM: FLATHEAD CO. MAY MANAGE ROAD RIGHT-OF-WAY.
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SCHASSBERGER, L.A. 1988 FIELD SURVEYS OF LAKE AND FLATHEAD
 COUNTIES.
 SOURCECODE: F88SCH05MTUS S86LESUMMTUS PNDSCH02MTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: N OWNERINFO:
 TRANSCRIBR: 87-01-22 JSS CDREV: Y MAPPER: 87-01-22 JSS QC: Y
 UPDATE: 88-12-21 LAS

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.007
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 10 TENTEN: 4,6 IDENT: Y EORANK: AB
 SURVEYSITE: LOWER GRASSY CREEK
 EORANKCOMM: PRIVATELY OWNED, POSSIBLY SOME GRAZING
 SURVEYDATE: 1988-07-05 LASTOBS: 1988-07-05 FIRSTOBS: 1988 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
 QUADCODE: 4711387
 QUADNAME: SWAN LAKE PRECISION: SC
 LAT: 475556 LONG: 1134950 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 025N018W SECTION: 13 MERIDIAN: PR TRSCOMM: SE4NW4NW4,NE
 4SW4NW4
 PHYSPROV: NR WATERSHED: 17010211 RIVERREACH: 1701021100000.00
 DIRECTIONS: CA. 0.6 MILE NE OF HIGHWAY 83 AT SWAN LAKE, ALONG THE GROOM
 CREEK ROAD, SE OF ROAD.
 GENDESC: BOGGY SEEP AREA IN CREEK DRAINAGE; BENEATH PICEA ENGELMANNII
 AND RHAMNUS ALNIFOLIA, WITH SENECEO TRIANGULARIS AND
 HABENARIA DILATATA.
 ELEV: 3260 SIZE: 1
 EODATA: CA. 200 PLANTS, FLOWERING.
 COMMENTS: VOUCHER, SCHAESSBERGER, L.A. (240). 1988. MONTU; SEE GMF FOR
 BASE MAP SHOWING POPULATION.
 MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER:
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SCHAESSBERGER, L.A. 1988. FIELD SURVEYS IN FLATHEAD AND LAKE
 COS. OF 5-14 JULY.
 SOURCECODE: F88SCH05MTUS PND8SCH02MTUS S88SCHUMMTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 88-08-04 LAS CDREV: Y MAPPER: 88-09-29 MEZ QC: Y
 UPDATE: 88-10-13 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.008
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 11 TENTEN: 5,7 IDENT: Y EORANK: AB
 SURVEYSITE: BOND CREEK
 EORANKCOMM: GOOD SITE, SMALL POPULATION
 SURVEYDATE: 1988-07-06 LASTOBS: 1988-07-06 FIRSTOBS: 1988 GRANK: 64
 SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
 QUADCODE: 4711387
 QUADNAME: SWAN LAKE PRECISION: SC
 LAT: 475523 LONG: 1134832 S: 475518 N: 475625 E: 1134753 W: 1134848
 TOWNRANGE: 025N017W SECTION: 18 MERIDIAN: PR TRSCOMM: NE4SW4SW4.SI
 4SE4+
 PHYSPROV: NR WATERSHED: 17010211 RIVERREACH: 1701021105900.00
 DIRECTIONS: ALSO: T25NR18W:24E2NE4NE4. CA. 2 AIR MILES EAST OF SWAN
 LAKE, CA. 1.8 MILES EAST OF HIGHWAY 83 ON BOND CREEK TRAIL,
 EAST AND WEST OF TRAIL 0.1 MILE.
 GENDESC: IN SEEPS WHICH EVENTUALLY FEED BOND CREEK; BENEATH PICEA
 ENGELMANNII AND BETULA PAPYRIFERA, WITH SENECIO TRIANGULARIS
 AND HABENARIA DILATATA.
 ELEV: 3400 SIZE: 2
 EODATA: 255 PLANTS IN 3 SUBPOPULATIONS, FEW FLOWERING.

COMMENTS: VOUCHER, SCHAASSBERGER, L.A. (243). 1988. MONTU; SEE GMF FOR
 BASE MAP SHOWING POPULATION.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: F SITECODE:

SITENAME:

OWNER: FLATHEAD NATIONAL FOREST

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEYS IN FLATHEAD AND LAKE
 COS. OF 5-14 JULY.

SOURCECODE: F88SCH05MTUS PND SCH02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-08-04 LAS CDREV: Y MAPPER: 88-09-30 MEZ QC: Y

UPDATE: 88-10-13 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.009
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 2 TENTEN: 9,7 IDENT: Y EORANK: A
 SURVEYSITE: KRAUSE BASIN ROAD
 EORANKCOMM: EXCELLENT SITE
 SURVEYDATE: 1988-07-06 LASTOBS: 1988-07-06 FIRSTOBS: 1988 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAM: MTFLAT
 QUADCODE: 4811421
 QUADNAME: HASH MOUNTAIN PRECISION: SC
 LAT: 480951 LONG: 1140037 S: 0 N: 0 E: 0 W: 0
 TOWNRANGE: 028N019W SECTION: 28 MERIDIAN: PR TRSCOMM: E2NE4
 PHYSPROV: NR WATERSHED: 17010208 RIVERREACH: 1701020800000.00
 DIRECTIONS: CA. 14 AIR MILES EAST OF KALISPELL; CA. 1.8 MILES EAST OF
 FOOTHILL ROAD, ON LOWER KRAUSE BASIN ROAD, SOUTH OF ROAD.
 GENDESC: INTERMITTENT CREEK, TYPHA SWAMP SURROUNDED BY PICEA
 ENGELMANNII, WITH TYPHA LATIFOLIA AND SCIRPUS SPP.
 ELEV: 3260 SIZE: 2
 EODATA: CA. 5,000 PLANTS; FLOWERING.
 COMMENTS: VOUCHER, SCHAESSBERGER, L.A. (241). 1988. MONTU. SEE GMF FOR
 BASE MAP SHOWING POPULATION.
 MACODE1: SSLGNXXX1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: STATE OF MONTANA
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SCHAESSBERGER, L.A. 1988. FIELD SURVEYS IN FLATHEAD AND LAKE
 COS. OF 5-14 JULY.
 SOURCECODE: FB8SCH05MTUS PND8SCH02MTUS S88SCHUMMTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 88-08-04 LAS CDREV: Y MAPPER: 88-09-30 MEZ QC: Y
 UPDATE: 88-10-13 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.010
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 12 TENTEN: 1,8 IDENT: Y EORANK: CD
 SURVEYSITE: STOPPER CREEK
 EORANKCOMM: SMALL POPULATIONS, CLOSE TO ROAD.
 SURVEYDATE: 1988-07-13 LASTOBS: 1988-07-13 FIRSTOBS: 1988 GRANK: 64
 SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
 QUADCODE: 4711387
 QUADNAME: SWAN LAKE PRECISION: SC
 LAT: 475416 LONG: 1135225 S: 475408 N: 475418 E: 1135222 W: 1135228
 TOWNRANGE: 025N018W SECTION: 27 MERIDIAN: PR TRSCOMM: SE4NW4NW4,NE
 4SW4NW4
 PHYSPROV: NR WATERSHED: 17010211 RIVERREACH: 1701021100700.00
 DIRECTIONS: CA. 2 AIR MILES SW OF SWAN LAKE. TRAVEL 1.5 MILES WEST OF
 HIGHWAY 83 ON PORCUPINE CREEK ROAD, CA. 1.3 MILES NORTH ON
 YEW CREEK ROAD.
 GENDESC: IN BORROW PIT NEXT TO ROAD AND BELOW ROAD 300 YDS. ON EDGE
 OF WET MEADOW, WITH SALIX SPP., HABENARIA DILATATA, SENECIOT
 RIANGULARIS.
 ELEV: 3100 SIZE: 1
 EODATA: CA. 185 PLANTS IN TWO SUBPOPULATIONS, FLOWERING.

COMMENTS: VOUCHER, SCHAASSBERGER, L.A. (245). 1988. MONTU; SEE GMF FOR
 BASE MAP SHOWING SUBPOPULATIONS.

MACODE1: PRIVATEOWNMTUS CONTAINED1: MACODE2: FFWRWSWAN1MTUS CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: F SITECODE:

SITENAME:

OWNER:

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE: SCHAASSBERGER, L.A. 1988. FIELD SURVEYS IN FLATHEAD AND LAKE
 COS. OF 5-14 JULY.

SOURCECODE: F88SCH05MTUS PNDSCH02MTUS S88SCHUMMTUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:

TRANSCRIBR: 88-08-04 LAS CDREV: Y MAPPER: 88-09-30 MEZ OC: Y

UPDATE: 88-10-13 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PMORC11010.011
 NAME: EPIPACTIS GIGANTEA
 COMNAME: GIANT HELLEBORINE
 MARGNUM: 15 TENTEN: 1,3 IDENT: Y EORANK: C
 SURVEYSITE: LOWER FATTY CREEK ROAD
 EORANKCOMM: THREE FEET FROM HEAVILY USED LOGGING ROAD.
 SURVEYDATE: 1988-07-14 LASTOBS: 1988-07-14 FIRSTOBS: 1988 GRANK: G4
 SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
 QUADCODE: 4711377
 QUADNAME: CILLY CREEK PRECISION: SC
 LAT: 475053 LONG: 1135145 S: 475044 N: 475055 E: 1135143 W: 1135147
 TOWNRANGE: 024N018W SECTION: 11 MERIDIAN: PR TRSCOMM: SW4SE4,14NW4
 NE4
 PHYSPROV: NR WATERSHED: 17010211 RIVERREACH: 1701021100000.00
 DIRECTIONS: CA. 5.3 AIR MILES SW OF SWAN LAKE, CA. 1.5 MILES WEST OF
 HIGHWAY 83 ON PORCUPINE CREEK ROAD, SOUTH 3.1 MILES ON LOWER
 FATTY CREEK ROAD; WEST OF ROAD.
 GENDESC: IN SEEPS OF BORROW PIT; WITH HABENARIA DILATATA AND SALIX
 SPP., NEAR THUJA PLICATA AND BETULA PAPYRIFERA.
 ELEV: 3110 SIZE: 1
 EODATA: CA. 200 PLANTS, FLOWERING AND FRUITING.
 COMMENTS: VOUCHER, SCHASSBERGER, L.A. (248). 1988. MONTU; SEE GMF FOR
 BASE MAP SHOWING SUBPOPULATIONS.
 MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2:
 MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
 MOREMGMT: F SITECODE:
 SITENAME:
 OWNER: FLATHEAD NATIONAL FOREST
 OWNERCOMM:
 PROTCOMM:
 MGMTCOMM:
 MONITOR: MONITORNUM:
 BESTSOURCE: SCHASSBERGER, L.A. 1988. FIELD SURVEYS IN FLATHEAD AND LAKE
 COS. OF 5-14 JULY.
 SOURCECODE: F88SCH05MTUS PND8SCH02MTUS S88SCHUMMTUS
 DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO:
 TRANSCRIBR: 88-08-04 LAS CDREV: Y MAPPER: 88-09-30 MEZ QC: Y
 UPDATE: 88-12-02 LAS

USGS Bearmouth Quadrangle (15')
Nimrod Warm Springs (001)

Epipactis gigantea

USGS Cilly Creek Quadrangle (7.5')

Epipactis gigantea

Cilly Creek (002)

Lower Cilly Creek Road (011)

USGS Bluewater Quadrangle (7.5')

Epipactis gigantea

Bluewater Spring (003)

USGS Swan Lake Quadrangle (7.5)

Epipactis gigantea

Swan Lake (005)
Stopper Creek (010)

USGS Jewel Basin Quadrangle (7.5')

Epipactis gigantea

Echo Lake (006)

USGS Swan Lake Quadrangle (7.5')

Epipactis gigantea

Lower Grassy Creek (007)
Bond Creek (008)

USGS Hash Mountain (7.5')

Epipactis gigantea

Krause Basin Road (009)

V. PHOTOGRAPHS

A. Epipactis gigantea - habit, Flahead N.F..

C. Epipactis gigantea - habitat, Flathead N.F..

D. Epipactis gigantea - habitat, Flathead N.F..

E. Epipactis gigantea - habitat.

MONTANA STATE LIBRARY